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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,841	11/13/2001	Akihiro Akiba	P/2041-66	8589

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EXAMINER

VIGUSHIN, JOHN B

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/008,841

Applicant(s)

AKIBA, AKIHIRO

Examiner

John B. Vigushin

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 4 is objected to because of the following informalities:

In Claim 4, lines 6-8 should be amended as follows for clarity: --a screw formed of an electrically conductive body and fixing said plurality of printed circuit boards [with preventing said connectors] such that said connectors are prevented from disengaging from each other;--

Appropriate correction is required.

Rejections Based On Prior Art

2. The following references were relied upon for the rejections hereinbelow:
Kawaguchi et al. (US 5,380,211) Wong et al. (US 4,929,185)
Miller (US 5,130,894)

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 4 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawaguchi et al.

As to Claims 1 and 4, Kawaguchi et al. discloses, in Figs. 1 and 4 (col.2: 25-37): a plurality of printed circuit boards 2 and 4 having wiring formed thereon; a part of the wiring on the printed circuit boards 2 and 4 (i.e., wiring 18 on board 2 and wiring 19 on board 4; see Fig. 1) electrically connected through male and female connectors 20 and 60, respectively (by means of legs 24 of male terminals 22 and legs 64 of female terminals 62; see Fig. 1 and col.2: 25-32); a screw 6 (col.2: 32-35) formed of an electrically conductive body (col.2: 48-50) and fixing the plurality of printed circuit boards 2 and 4 such that connectors 20 and 60 are prevented from disengaging from each other; the remaining part of the wiring on printed circuit boards 2 and 4 (i.e., wiring 16 on board 2 and wiring 17 on board 4; see Fig. 1) electrically connected through screw 6 (Fig. 1; col.2: 41-50).

As to Claims 3 and 6, Kawaguchi et al. further discloses that the signal lines of the printed circuit boards 2 and 4 are electrically connected with each other by screw 6 (col.2: 41-50).

5. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Wong et al.

As to Claims 1 and 4, Wong et al. discloses, in Figs. 1 and 2: a plurality of printed circuit boards 12 and 14 having wiring thereon; a part of the wiring electrically connected through connectors 16 and 22; a screw 28 formed of an electrically conductive body (col.3: 26-30) and fixing the plurality of printed circuit boards 12 and 14 such that connectors 16 and 22 are prevented from disengaging from each other; the

remaining part of the wiring on the printed circuit boards 12 and 14 are electrically connected through screw 28 (col.3: 30-35).

As to Claims 2 and 5, Wong et al. further discloses that power source (ground) lines of printed circuit boards 12 and 14 are electrically connected with each other by screw 28 (col.3: 26-35).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Kawaguchi et al.

A) As to Claims 1 and 4:

I. Miller discloses, in Figs. 1, 2 and 5: a plurality of printed circuit boards 10-1, 10-2, 10-3 and 20 having wiring formed thereon; a part of the wiring on printed circuit boards 10-1, 10-2, 10-3 and 20 electrically connected through connectors 50 (col.3: 47-54); a bolt 51 formed of an electrically conductive body and fixing the plurality of printed circuit boards 10-1, 10-2, 10-3 and 20 such that connectors 16 and 22 are prevented from disengaging from each other (col.3: 59-62); the remaining part of the wiring on printed circuit boards 10-1, 10-2, 10-3 and 20 are electrically connected through bolt 51 (col.3: 60-62).

II. Miller discloses a bolt 51 for conductively and mechanically connecting printed circuit boards 10-1, 10-2, 10-3 and 20 but does not teach a conductive screw for the same purpose.

III. Kawaguchi et al. discloses electrically and mechanically connecting printed circuit boards 2 and 4 with male and female connectors 20 and 60, respectively, said connectors 20 and 60 mated by a conductive bolt or conductive screw 6 (col.2: 32-41), wherein the screw 6 interconnects signal circuits 16 and 17 on the pair of circuit boards 2 and 4 (col.2: 41-50) and connectors 20 and 60 interconnect power source (ground) lines 18 and 19 (col.2: 25-32).

IV. Since both Miller and Kawaguchi et al. are in the art of mechanically and electrically interconnecting stacked circuit boards, then the use of threaded fasteners, such as screws, or non-threaded bolts, for electrically connecting the stacked circuit boards, as taught by Kawaguchi, would have been readily recognized in the pertinent art of Miller, wherein Miller even teaches the slot in the head of "bolt" 51 suitable for a screw-driver tip (see Fig. 5) and wherein the threading would facilitate repeated insertion and removal of the screw for easier upgrade and replacement of the stacked circuit boards.

V. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the bolt shaft and the through-holes in the connectors and/or the printed circuit boards of Miller with threading for accommodating a conductive screw, as taught by Kawaguchi et al. in order to have a more easily insertable/removable conductive fastener system than that of a bolt in stacked board

applications where it is desirable for the end-user to have greater ease in periodically upgrading the stacked module or replacing defective circuit boards in the stack.

B) As to Claims 2 and 5, modified Miller further discloses that power source lines of printed circuit boards 10-1, 10-2, 10-3 and 20 are electrically connected with each other by screw 51 (col.3: 60-62).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Reichard (US 6,472,613 B1) discloses plural circuit boards 12 and 28 electrically and mechanically connected by a bolt, post or screw 40 providing electrical communication between first and second conducting paths 26, on board 12, and 32, on board 28 (Figs. 3-5; col.4: 6-14).

b) Casey (US 5,536,177) discloses a threaded bolt 120 for electrically and mechanically connecting the stacked assembly of circuit boards, wherein the threaded bolt 120 is conductive and the power source (ground) lines of the stacked circuit boards are electrically connected by screw 120 (Figs. 2 and 7; col.3: 48-54; col.5: 59-col.6: 9).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Vigushin whose telephone number is 703-308-1205. The examiner can normally be reached on 8:30AM-5:00PM Mo-Fri.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



John B. Vigushin
Examiner
Art Unit 2827

jbv
March 22, 2003